

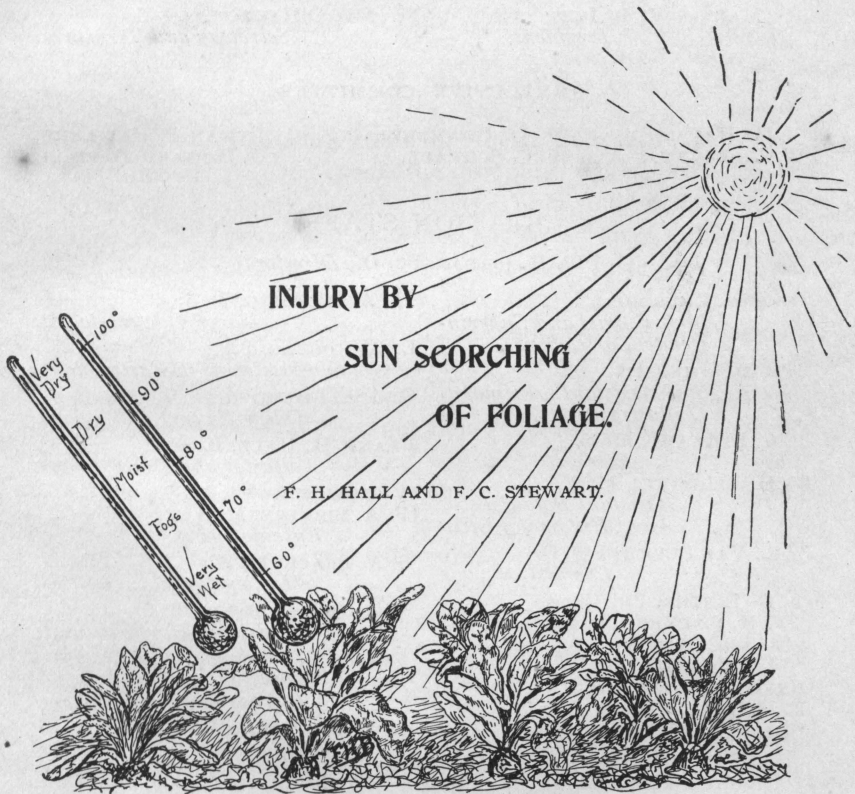
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*Connected with Fertilizer Control.

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POPULAR EDITION*

OF

BULLETIN No. 162.

INJURY BY SUN SCORCHING OF FOLIAGE.

F. H. HALL.

The long tubes of the rolled corn blades, the **Disease or** parched grass, the drooping, wilted leaves of the **drought ?** clover and the dusty, limp foliage of potatoes, beans and squashes suggested discouragement to many farmers during the thirsty summer just past. These familiar signs need no interpreter, however. "Give me water lest I die," is the cry they voice with increasing shrillness as the days go by ; a cry the farmer can usually answer only with a hope that timely showers will soon restore sap to the sapless stems. If the longed-for rain does not delay too long, all will be well ; for the plants are not dead, they are only thirsty.

Other effects there were, of heat and drought, so different from these that plant growers in many places were deceived and thought their crops struck with contagious disease.

Little can be done to prevent or remedy these latter weather injuries, yet their interest from many points of view and the need of distinguishing them from preventable diseases, gives value to observations made upon them this summer and fall.

* This is a brief review of Bulletin No. 162 of this Station, on Leaf Scorch of the Sugar Beet, Cherry, Cauliflower and Maple, by F. C. Stewart. Anyone interested in the detailed account of the investigations will be furnished, on application, with a copy of the complete bulletin. The names of those who so request will be placed on the Station mailing list to receive future bulletins, popular or complete as desired. Bulletins are issued when investigations are completed and appear at irregular intervals, not monthly.

**Cause of
injury.**

Plants in vigorous growth require astonishing quantities of water (from 270 to 380 times their weight during the season) which enters the circulation through the tiny root hairs and passes away through little mouths upon the foliage. This evaporation from leaf surfaces is called transpiration. In time of ordinary drought the plant can protect itself from harm through excessive transpiration by rolling up its leaves so that less surface is exposed to the air and by partial closing of the breathing pores. In this way permanent injury is delayed for days or weeks.

Sometimes, though, days will come, dry, hot, stifling, with a wind parching as from the mouth of a furnace. The plant can not adapt itself to conditions changed so suddenly ; the leaves give off water faster than the roots can pump it to them ; and portions of the foliage are scorched to death. Fortunately, we in the East do not often suffer so ; but this season loss was felt from this cause on sugar beets, cauliflowers, and cherry and maple trees.

**On sugar
beets.**

During the latter part of August some sugar beet growers near Halls and Stanley thought their fields struck with blight. On investigation the leaves were found with brown or black dead margins, the young leaves in the center of the crown were often

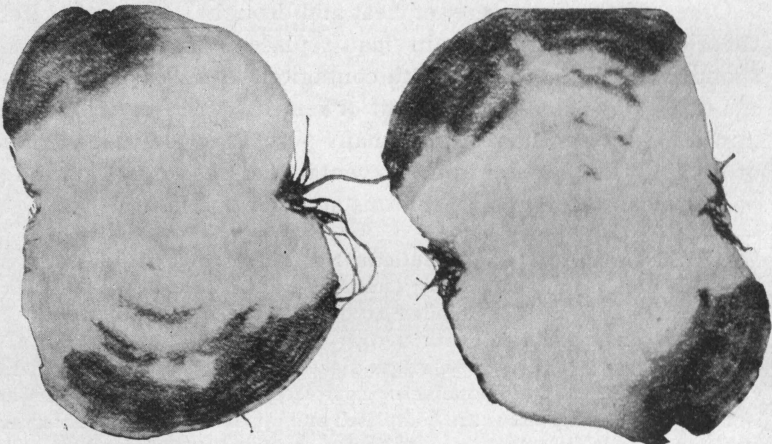


FIG. 1.—SECTIONS OF INJURED SUGAR BEET

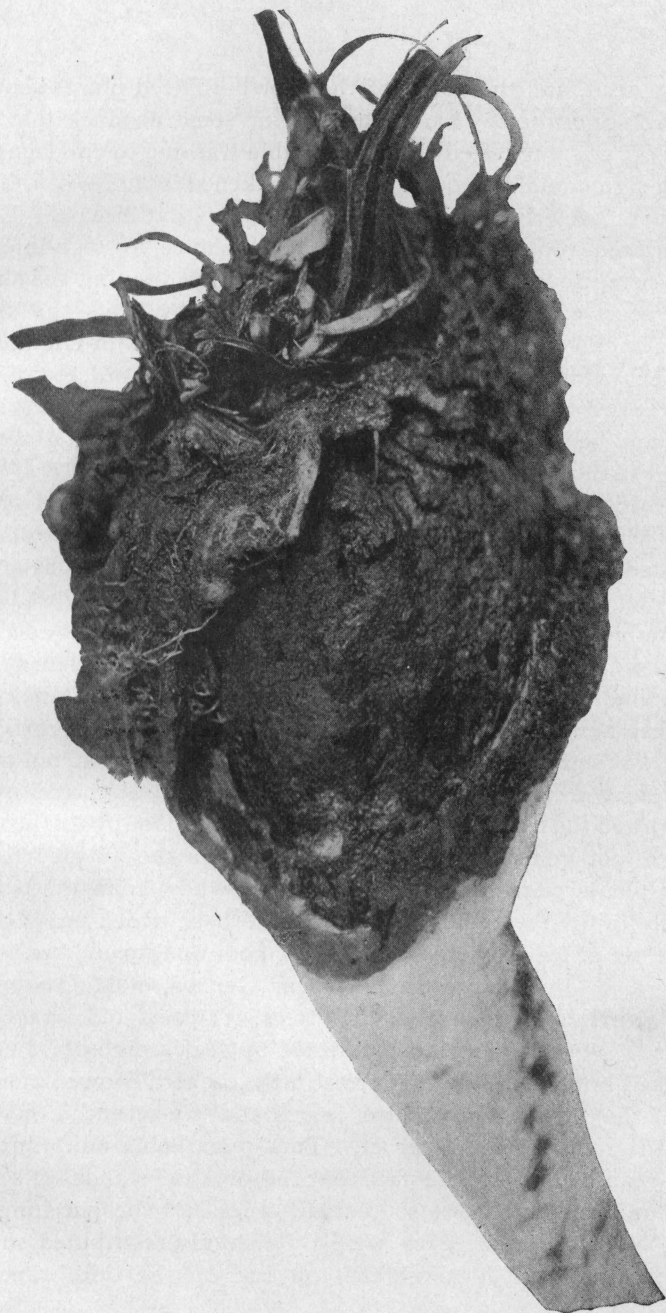


PLATE I.—SUGAR BEET INJURED BY LEAF SCORCH.

wholly dead, and the roots of the worst affected plants showed brown discolorations which extended for some distance into the flesh. It was suggested that the trouble was due to cabbage rot, but no sign could be found of the blackened bundles of vessels filled with bacteria which is characteristic of that disease. Later the injured roots showed a close resemblance to scab-infested beets, being rough, warty and eaten by millipedes; but the shape of the scars was quite different. Upon scabby beets the spots appear on all parts of the root and are irregular or circular in outline; while these dead areas are usually V-shaped, extending from the crown of the beet downward. The scabby appearance could not be spread to healthy beets by transferring plugs of injured tissue to them.

The location and character of the soil (generally light sandy loam) where some of the worst effects of the trouble were shown indicated a lack of water, and study of weather conditions at the time when the killing of the beets was first noticed showed that the trouble followed hot, dry days. That it was not the effect of ordinary drought was proved by the fact that, without rain in any useful amount, many of the beets whose foliage had been killed put forth new leaves which grew with considerable luxuriance. There was sufficient water in the soil for ordinary growth, but when the sudden extra demand came the roots could not pump it fast enough and the leaves scorched. The damage done by this scorch, though not general, was considerable upon the affected fields. Many plants were killed entirely, those whose foliage was only slightly injured were poor in sugar, and those which put forth a second set of leaves were small and of poor quality.

A large orchard near Geneva, of Montmorency

On cherry. Ordinaire cherry trees, 11-years old, was also very seriously affected by leaf scorch. On October 4, all but two of the 715 trees in the orchard showed more or less of the brown, crisp, dead leaves and six-sevenths of them showed from 75 to 85 per ct. This remarkable uniformity of injury can be laid to the fact that the orchard stands on soil of very uniform character, so that all trees felt the parching air alike. The affected leaves were quite evenly distributed on the trees, scattered all through the top and on the side branches.

Sometimes one side only of a tree would be affected, but it was as often the north side as the south, the east as the west.

This evenness of distribution plainly shows that it is no disease, and the shallowness of the soil (eighteen inches to two feet of light clay underlaid with slate) explains the lack of water to meet the sudden need. This demand probably came about August 20.

Pear trees in this same orchard were not affected, nor were apples, pears or plums in orchards adjoining. English Morello cherries at one end of this plat and younger Montmorencies at one side in deeper soil showed some scorch but not nearly as much as the main plantation of Montmorencies.

The orchard was slightly affected in 1897 and quite seriously in 1898; but, notwithstanding the loss of foliage, bore a good crop of fruit in 1899 and shows no signs of permanent injury from the very severe scorching of this season.

Leaf scorch was quite common on cauliflower on Long Island, but did little harm. It showed itself only in the crisp, black margins of young, unfolding leaves grown just before August 20.

The injury in this case is thought to be due largely to the fact that several foggy days were followed by others of hot sunshine. The leaves were tender from their growth in the foggy weather and scorched easily.

This trouble on cauliflowers might be confused with the black rot; but shows no black fibrovascular bundles. It is worst on the *margins* of *young* leaves, not affecting older leaves; while the rot effects the *margins* of the *old* leaves and the *entire blade* of the *young* leaf.

Sugar maples and Norway maples both showed the same trouble; and on many trees half the foliage was brown and dead weeks before its natural time. These trees are quite sensitive, especially when newly transplanted, and show more or less injury from this cause every year. If it occurs early in the season the leaves may fall and new ones take their places; but if they are full grown when affected, they may cling to the trees, showing a dead border and living center, or a patch of brown at the center surrounded by green.

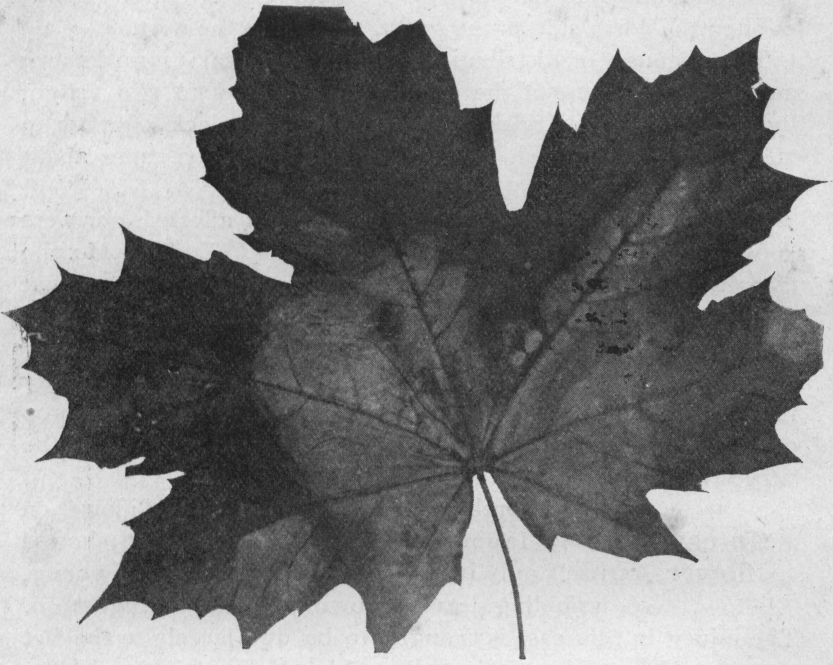


FIG. 2.—MAPLE LEAF INJURED BY LEAF SCORCH.

This scorch might be mistaken for maple anthracnose ; but the latter seldom occurs on old trees. It attacks the leaves and young shoots, often causing "heads" of the much branched tips. The leaves are dwarfed, yellowish green in color and with margins turned down and blackened as if by frost.

There is, strictly speaking, no remedy for leaf scorch, for it is not a disease ; nor can the trouble be entirely prevented until we can control sun and shower. By keeping the land constantly stirred, especially after every shower, we can keep what water the skies send us and thus help out the plants ; and by irrigation, where this is possible, we may almost completely avoid loss from scorching of foliage.